ligion we read: "The idea of God does not and cannot proceed from the external world but nevertheless it finds its *historic* origin (as art, science and government do) in the desperate struggle for life, in the satisfaction of the animal wants and passions, in those vulgar aims and notions which possessed the mind of primitive man to the exclusion of everything else." Religion, however, does not 'begin and develop under the operation of inflexible laws;' these 'potently incline; they do not coerce.' Symbols and myths originate "in dealing with matters beyond the cognizance of the senses; the mind is forced to express its meaning in terms transferred from sensuous perception, or under symbols borrowed from the material world." Therefore to understand these transfers, and to reach the 'real meaning of the myth,' we are told: "With delicate ear the faint whispers of thought must be apprehended" (by the student) "which prompt the intellect when it names the immaterial from the material; when it has to seek amid its concrete conceptions for those suited to convey its abstract intuitions."

These general statements precede a rapid but clear presentation of the physical and intellectual peculiarities of the red race, wherein their language, mnemonics and written records are reviewed, and the probable migrations of its chief families indicated, and their location given when they were first known historically.

In chapters 2 to 9, inclusive, the author treats broadly and suggestively, the Idea of God; the Origin and Application of the Sacred Number; the Symbol of the Bird and the Serpent; the Myth of Water, Fire and the Thunder-storm; the Supreme Gods of the Red Race; the Myth of the Creation, the Deluge, the Epochs of Nature and the Last Day; the Origin of Man; the Soul and its Destiny; the Native Priesthood; and the Influence of the Native Religion on the Moral and Social Life of the Race. An index in which over three hundred and fifty authorities are cited, and another of the subjects touched upon, closes the volume of 360 pages.

It is impossible within this brief notice to even outline the arguments and evidence presented by our author; he has brought wide learning and careful thinking to bear upon his theme, and has established a thesis that it will be difficult to successfully assail.

It is true that there are students who do not fully share the insistance of the author for the complete isolation of the American race, an isolation which insured an indigenous growth of its culture. While recognizing American characteristics, some are inclined to consider contact with the Old World during the centuries as more or less probable, and point to certain similarities and parallelisms as possible evidence of the fact. 'Those analogies and identities' * * 'whether in myth, folklore or technical details,' our author attributes 'wholly and only to the uniform development of human culture under similar conditions,' and deprecates 'contact and transference' as affording an adequate explanation.

The points of difference between the author and other students upon this and a few minor matters are not radical and do not invalidate the gist of the argument found in the volume, namely, the psychical solidarity of mankind. There can be no question of the efficient service which has been rendered by the author in this book toward the establishment of this great truth, the far-reaching influence of the acceptance of which is being felt in a broader and deeper religious faith, and in the growth of higher international and, one might say, interracial ethics. ALICE C. FLETCHER.

SCIENTIFIC JOURNALS.

THE ASTROPHYSICAL JOURNAL, OCTOBER, 1896.

The effect of Pressure on Wave-length: By J. F. MOHLER. A continuation of the investigations of W. J. Humphreys and J. F. Mohler on the *Effect of Pressure on the Wave-length of Lines in the Arc-spectra of Certain Elements.* The latter investigation was carried on with pressures exceeding one atmosphere. The present paper deals with pressure below one atmosphere. Special attention was given to the spectrum of cadmium, with the hope that the light might be thrown upon the matter of discrepancy between the absolute measurements of cadmium wave-lengths by Michelson, and the determinations of the same lines by Rowland upon the

foundation of Bell's work. Unhappily, the hoped-for illumination was not eminently satisfactory. In general, the results of the previous work were found to be capable of extrapolation to low pressures. With some exceptions, the shift of a line for any given element was approximately proportional to the product of the atmospheric pressure to which the arc was subjected into the wave-length of the line in question. The law that the shift is also proportional to the absolute temperature of the melting point of the element was not verified.

Solar Observations Made at the Royal Observatory of the Roman College During the First Half of 1896: By P. TACCHINI. A tabulation of results showing the distribution of spots, faculæ, and prominences upon the sun's surface throughout the half-year.

Résumé of Solar Observations Made at the Astrophysical Observatory at Catalona in 1895: By A. MASCARI. A tabulation similar in form to the preceding, but with more extended discussion.

Certain Considerations Concerning the Accuracy of Eye-Estimates of Magnitudes by the Method of Sequences: By ALEX. W. ROBERTS. Prof. Pickering having spoken deprecatingly of the estimation of stellar magnitudes by the unaided eye, the article appears as a defense of such determinations. In the method pursued by the author stars of the magnitudes 6.8 and 9.3 were determined, being respectively on the limit of visibility of the naked eye and a one-inch telescope. The magnitudes of certain comparison stars were determined by interpolation between these values, and with these the star suspected of variability was compared. Measurements of the variable L 5861 show the mean discrepancies of a single observation to be less than 0.04 mag. The relative position of two stars in the field of view is shown to have an important effect upon the estimation of their relative brightness. This personal error is eliminated by using successively direct vision and reversing eye-pieces. The final conclusion is that eye-estimates are as trustworthy as any that are being made photometrically.

On the Level of Sun-spots: By EDWIN B. FROST. A review of the various sun-spot theories in the light of recent investigations. After a respectful consideration of the hypothesis of Wilson, that sun-spots are depressions in the photosphere, Prof. Frost points out that there is very little to substantiate it. The existence of the apparent effects of perspective on the so-called penumbra, upon which the theory mainly rests, is doubted by many of the most careful observers. Measurements of the relative thermal radiation of spots and contiguous portions of the photosphere show an increase in favor of the spots as they approach the limb of the sun. But the radiation of the spot compared with that from the center of the disc decreases as the spot approaches the limb. This would apparently be the case if the spot were composed of radiating matter at a height above the photosphere, since in that case its heat would not be so subject to the absorption of the atmosphere on the sun's limb. Again, the velocities of rotation upon the sun's surface are in the following ascending order: velocity of iron vapor, of spots, of faculæ. It would appear from this that the elevation of the spots might reasonably be supposed to be intermediate between that of the absorbing iron vapor and faculæ, and therefore above the photosphere. This opinion is supported by the investigations of Wilczynski.

Researches upon the Arc-spectra of the Metals. II. The Spectrum of Titanium. II. (Continued from Aug. Ap. J.): By B. HASSELBERG. A tabulation of the Titanium lines from λ 3477 to λ 5900. The presence of titanium in the sun is proven, and the lines compared with other determinations. A chart of the spectrum accompanies the article.

Minor Contributions and Notes, Harvard college circulars 10 and 11; notices.

Review of *The Equipment of the Astrophysical Observatory of the Future. G. Johnstone Stoney, A. M., etc.:* By F. L. O. WADSWORTH. Bibliography of recent astrophysical literature.

THE AMERICAN GEOLOGIST, NOVEMBER.

AN iron meteorite weighing 19¾ pounds, found near Arlington, Minn., is described by N. H. Winchell.

H. W. Fairbanks discusses the age of the California Coast Ranges. Considerable antiquity for these mountains is claimed, and a number of profound oscillations are noted, be-

ginning with the Jurassic and continuing down to the present.

M. E. Wadsworth makes a strong plea for the introduction of the elective system in engineering colleges, based upon practical experience in the Michigan Mining School.

Orotaxis; A method of geologic correlation: C. R. KEYES. This may be defined as a systematic arrangement of mountains, or orotaxis, in which the cycles of elevation and degradation, together with the consequent unconformities in the sediments of separate cycles, are made the basis of geological chronology. The method has had its greatest use in pre-Cambrian and other nonfossiliferous series. The author claims that it may serve equally reliable and serviceable ends in the correlation of even richly fossiliferous horizons.

Human relics in the drift of Ohio: E. W. CLAYPOLE. The principal specimen, and the one on which the main argument rests, is a small grooved axe found at a depth of 22 feet in boulder clay. All the collateral evidence, such as the oxydized condition of the axe and the circumstances of the find, points to the genuine antiquity of this relic.

SOCIETIES AND ACADEMIES.

GEOLOGICAL SOCIETY OF WASHINGTON.

THE 51st meeting of the Geological Society, the first of the winter season of 1896, was held in Washington on November 11th. Mr. J. E. Spurr briefly described the reconnaissance of the gold resources of the Yukon region of Alaska, from which he has just returned. The Geological Survey party in his charge crossed the Chilkoot Pass, about the middle of June, to the headquarters of the Yukon, and proceeded down the river to the chief gold-bearing localities. The principal producing districts, those of Forty-Mile Creek and Birch Creek, were thoroughly explored, as well as other less important localities. The party then continued down the Yukon, examining the younger sedimentaries which overlie the gold-bearing formation, as far as Nulato. At this point passage was taken by steamer to St. Michael's, and the homeward journey begun.

One of the principal results of the expedition was the recognition of the gold-bearing rocks from which the gold in the river gravels is derived. These gold-bearing rocks constitute a distinct broad belt, running northwest into Alaska from British territory. They are in their lower portions schists and gneisses, with intrusive rocks, and in their upper portion somewhat altered sedimentaries. They are all older than Carboniferous, for the Carboniferous and younger rocks overlie them on both sides of the gold-bearing belt. In this belt the gold occurs partly in quartz veins, partly in deposits formed along shear-zones; in both occurrences it is contained in pyrite, and becomes free on weathering. The quartz veins are distinctly older than the shear-zone deposits, and were formed before the alteration of the enclosing rock to a schist; they have, therefore, partaken of this shearing, and have been broken and sheared so that they are typically non-persistent. The deposits along shear-zones are, however, of later date than the shearing, and can be continuously followed.

The younger beds which overlie the gold-bearing belt consist in part of conglomerates, and some of these conglomerates are fossil placers, which give promise of being productive.

Mr. S. F. Emmons, of the United States Geological Survey, gave a brief description of the gold deposits of the northern end of the Black Hills of South Dakota. The geological structure of the region is that of a series of steeply upturned Algonkian slates, on the basset edges of which rest nearly horizontal beds of Cambrian, Silurian and Carboniferous age. All these rocks are abundantly intersected in the mineral-bearing region by dikes and intrusive sheets of various porphyritic rocks, mostly of acid types. Erosion has removed the later rocks and included porphyry sheets from the valleys, but portions of them remain in the higher ridges and peaks. There are three types of gold deposits: The Homestake type of deposit, the siliceous gold ores of the Cambrian and the placer deposits. The first occur in sheets often several hundred feet wide along a mineral bearing zone, which is mostly controlled by the Homestake Company, and is now worked to a vertical depth of 800 feet. The placer deposits are partly ancient or fossil placers at the base of the Cambrian (Middle Cambrian, and